WE CLAIM:

1. A method for transforming an input data stream into an output data stream, one of the input and output data streams being a line-based data stream, the other of the input and output data streams being a block-based data stream, said method comprising the steps of:

a) assigning addressable locations of a buffer memory with write labeled positions according to a write data sequence;

b) writing the input data stream into the addressable locations of the buffer memory in accordance with the write labeled positions and the write data sequence;

c) calculating read labeled positions corresponding to the write labeled positions in accordance with the write data sequence and a read data sequence; and

d) in accordance with the read data sequence, reading data from the addressable locations of the buffer memory with reference to the read labeled positions so as to generate the output data stream.

2. The method as claimed in Claim 1, the input data stream being a line-based data stream, the output data stream being a block-based data stream, wherein, in step (c), the read labeled positions are calculated based on the formula:

$$O_n(t) = I_n((t\%h) \times w + (t/h))$$

where $O_n(t)$ is the read labeled position for a read data sequence (t) of an nth read operation, $I_n(t)$ is

the write labeled position for a write data sequence (t) of an nth write operation, (h) is the height of a data block, (w) is a total number of data blocks that can be accommodated in a single data block row of the buffer memory, (t%h) is the remainder of the quotient of (t) divided by (h), and (t/h) is the integer part of the quotient of (t) divided by (h).

3. The method as claimed in Claim 2, further comprising the steps of repeating steps b) to d), wherein, in the step b) that follows the step d), a write labeled position $I_{n+1}(t)$ for a write data sequence (t) of an (n+1)th write operation is equal to $O_n(t)$.

4. The method as claimed in Claim 1, the input data stream being a block-based data stream, the output data stream being a line-based data stream, wherein, in step (c), the read labeled positions are calculated based on the formula:

$$O_n(t) = I_n((t\%w) \times h + (t/w))$$

where $O_n(t)$ is the read labeled position for a read data sequence (t) of an nth read operation, $I_n(t)$ is the write labeled position for a write data sequence (t) of an nth write operation, (h) is the height of a data block, (w) is a total number of data blocks that can be accommodated in a single data block row of the buffer memory, (t%w) is the remainder of the quotient of (t) divided by (w), and (t/w) is the integer part of the quotient of (t) divided by (w).

5. The method as claimed in Claim 4, further comprising the steps of repeating steps b) to d), wherein, in the step b) that follows the step d), the write labeled position $I_{n+1}(t)$ for a write data sequence (t) of an (n+1)th write operation is equal to $O_n(t)$.

6. The method as claimed in Claim 1, wherein the write and read labeled positions are stored in a label memory.

7. A buffer device for transforming an input data stream into an output data stream, one of the input and output data streams being a line-based data stream, the other of the input and output data streams being a block-based data stream, said buffer device comprising:

a buffer memory adapted to be configured into addressable locations for writing the input data stream therein;

a label memory for storing write and read labeled positions; and

a buffer controller connected to said buffer memory and said label memory, said buffer controller

controlling the writing of the input data stream into the addressable locations of said buffer memory in accordance with the write labeled positions and a write data sequence,

calculating the read labeled positions corresponding to the write labeled positions in accordance with the write data sequence and a read data sequence, and updating the read labeled positions stored

in said label memory, and

in accordance with the read data sequence, reading data from the addressable locations of said buffer memory with reference to the read labeled positions stored in said label memory so as to generate the output data stream.

8. The buffer device as claimed in Claim 7, the input data stream being a line-based data stream, the output data stream being a block-based data stream, wherein said buffer controller calculates the read labeled positions based on the formula:

$$O_n(t) = I_n((t\%h) \times w + (t/h))$$

where $O_n(t)$ is the read labeled position for a read data sequence (t) of an nth read operation, $I_n(t)$ is the write labeled position for a write data sequence (t) of an nth write operation, (h) is the height of a data block, (w) is a total number of data blocks that can be accommodated in a single data block row of the buffer memory, (t%h) is the remainder of the quotient of (t) divided by (h), and (t/h) is the integer part of the quotient of (t) divided by (h).

9. The buffer device as claimed in Claim 8, wherein said buffer controller assigns a write labeled position $I_{n+1}(t)$ for a write data sequence (t) of an (n+1)th write operation as being equal to the read labeled position $O_n(t)$ for a read data sequence (t) of an nth read operation.

10. The buffer device as claimed in Claim 7, the input data stream being a block-based data stream, the output data stream being a line-based data stream, wherein said buffer controller calculates the read labeled positions based on the formula:

$$O_n(t) = I_n((t\%w) \times h + (t/w))$$

where $O_n(t)$ is the read labeled position for a read data sequence (t) of an nth read operation, $I_n(t)$ is the write labeled position for a write data sequence (t) of an nth write operation, (h) is the height of a data block, (w) is a total number of data blocks that can be accommodated in a single data block row of the buffer memory, (t%w) is the remainder of the quotient of (t) divided by (w), and (t/w) is the integer part of the quotient of (t) divided by (w).

11. The buffer device as claimed in Claim 10, wherein said buffer controller assigns a write labeled position $I_{n+1}(t)$ for a write data sequence (t) of an (n+1)th write operation as being equal to the read labeled position $O_n(t)$ for a read data sequence (t) of an nth read operation.